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The Correlation between Cooking Skills and Adherence to the Mediterranean Diet

Abstract

Background: The Mediterranean diet has been the most highly recommended diet by healthcare providers in the past decade. Current research has proven the Mediterranean diet benefits several aspects of health including decreased risk of diabetes, cardiovascular disease, obesity, and dementia. Despite increased awareness of these benefits, most patients still do not adhere to this diet. Multiple barriers may exist, but one such area that has not been well explored is improving adherence with cooking classes. The purpose of this review is to investigate how increased culinary skills correlates with increased adherence to a Mediterranean diet.

Methods: An exhaustive search of online medical literature was performed using MEDLINE-Ovid, Web of Science, CINAHL, and Google Scholar. Keywords used included: Mediterranean diet, diet adherence, and cooking skills. Search results were screened with eligibility criteria. Studies were appraised and assessed with GRADE.

Results: Two articles met eligibility criteria and were included in this systematic review. One observational study showed that children with better cooking skills had greater Mediterranean diet adherence. One RCT demonstrated that diabetics participating in a Mediterranean diet cooking class had more improved adherence and HbA1c when compared to a control group that received a standard nutrition education course. There are some consistent results showing the direct relationship between culinary skills and diet adherence. The overall quality of the two studies is low due to study limitations. Further studies can minimize these limitations to improve quality of evidence.

Conclusion: Results suggest that subsequent clinical trials are warranted to prove cooking classes can improve Mediterranean diet adherence; however, the two studies discussed in this review show support. Participating in a cooking class may or may not affect long-term Mediterranean diet adherence, but there is no harm in attempting this intervention. Cooking classes are another beneficial recommendation for patients who have difficulties adhering to a healthy diet.

Keywords: Mediterranean diet, diet adherence, cooking classes, culinary skills

Degree Type

Capstone Project

Degree Name

Master of Science in Physician Assistant Studies

Keywords

Mediterranean diet, diet adherence, cooking classes, culinary skills

Subject Categories

Medicine and Health Sciences

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The Correlation between Culinary Skills and Adherence to a Mediterranean Diet

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A Clinical Graduate Project Submitted to the Faculty of the

School of Physician Assistant Studies

Pacific University

Hillsboro, OR

For the Masters of Science Degree, August 2016

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ABSTRACT

Background: The Mediterranean diet has been the most highly recommended diet by healthcare providers in the past decade. Current research has proven the Mediterranean diet benefits several aspects of health including decreased risk of diabetes, cardiovascular disease, obesity, and dementia. Despite increased awareness of these benefits, most patients still do not adhere to this diet. Multiple barriers may exist, but one such area that has not been well explored is improving adherence with cooking classes. The purpose of this review is to investigate how increased culinary skills correlates with increased adherence to a Mediterranean diet.

Methods: An exhaustive search of online medical literature was performed using MEDLINE-Ovid, Web of Science, CINAHL, and Google Scholar. Keywords used included: Mediterranean diet, diet adherence, and cooking skills. Search results were screened with eligibility criteria. Studies were appraised and assessed with GRADE.

Results: Two articles met eligibility criteria and were included in this systematic review. One observational study showed that children with better cooking skills had greater Mediterranean diet adherence. One RCT demonstrated that diabetics participating in a Mediterranean diet cooking class had more improved adherence and HbA1c when compared to a control group that received a standard nutrition education course. There are some consistent results showing the direct relationship between culinary skills and diet adherence. The overall quality of the two studies is low due to study limitations. Further studies can minimize these limitations to improve quality of evidence.

Conclusion: Results suggest that subsequent clinical trials are warranted to prove cooking classes can improve Mediterranean diet adherence; however, the two studies discussed in this review show support. Participating in a cooking class may or may not affect long-term Mediterranean diet adherence, but there is no harm in attempting this intervention. Cooking classes are another beneficial recommendation for patients who have difficulties adhering to a healthy diet.

Keywords: Mediterranean diet, diet adherence, cooking classes, culinary skills

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Table I. Grade Quality of Assessment: Characteristic of Reviewed Studies

LIST OF ABBREVIATIONS

GCCM	Goldring Center for Culinary Medicine
HbA1C	Glycated Hemoglobin, Hemoglobin A1C
MD	Mediterranean Diet
RCT	Random control trial
T2D	Type 2 Diabetes

The Correlation between Culinary Skills and Adherence to a Mediterranean Diet

BACKGROUND

A prominent cause of reduced quality of life in the general population is chronic diseases such as diabetes, cardiovascular disease, and obesity.¹ Most of these chronic diseases can be associated, at least partially, to an individual's poor diet. Because these conditions affect so many people, extensive research has been done in regard to nutrition. A greatly discussed topic for the last decade or so has been the potential benefits of the Mediterranean diet (MD) and how it may or may not reduce the risk of chronic disease. MD focuses on eating primarily plant-based foods (fruits, vegetables, whole grains, nuts), healthy fats, fish, and poultry.² Ancel Keys was the first to research on the health benefits of the MD in the 1950s.³ He was fascinated by how inhabitants of the Mediterranean region had the longest lifespan in the world, and set out to analyze this population's diet. More than half a century later, research has continued to prove the worth of his investigation. Several studies have shown how MD can help prevent several chronic diseases including cardiovascular disease, cognitive decline, and diabetes.^{2,4-6} Close adherence to the Mediterranean diet is even associated with decreased all-causes morbidity and mortality.⁷ With all these benefits, it is surprising that more people wouldn't choose to adhere to this diet.

One suspected barrier to this lack of adherence is patient nutritional education. The medical community has become more aware of the need of patient education on proper eating habits, with MD as the foundation. There are now diabetic education specialties and registered dietitians that clinicians can refer their patients to. These referrals include classes on portion control, which carbohydrates cause increases in blood sugars, and proper insulin use. The Centers for Disease Control and Prevention has also implemented numerous state and local programs aimed at educating people about nutritional health and chronic disease prevention.⁸ Popular media has increased publicity of unhealthy eating and

its negative effects, too. Still, even with more knowledge and media attention on the benefits of a healthy diet, people are continuously failing to adhere to MD and similar healthy eating patterns. Despite this increase in patient education, other barriers apparently exist.

While there is more push on teaching patients what they should and should not eat in a counseling setting, there has not been an effort to teach those patients how to prepare healthy foods. Maybe the barrier is the ability to cook the food rather than ability to choose the food? One study highlighted that poor cooking skills correlated with less weekly consumption frequencies of healthy food groups like fruits and vegetables⁹ (part of the MD). The MD also focuses on lean proteins like fish and chicken, which can be challenging foods to cook for those who are used to boiling up pasta or microwaving a frozen dinner. Also, lack of cooking skills can cause patients to dine out more, which leads to less healthy choices.¹⁰ When patients dine out, they are less likely to know the quality of the ingredients they consume and more likely to overeat. Another hardship to overcome in preparing food is the ability to make those low fat and low sugar foods taste appealing. Evolutionarily, people tend to consume foods that their taste buds prefer when given the choice. Cooking classes are a way to increase some of these culinary skills and improve adherence to the healthier MD.

The MD has been extensively proven to improve multiple chronic diseases, but there is little yet studied on interventions that equip the general population with the culinary competencies needed to adhere to the diet. The most obvious way to increase culinary competency is to attend a cooking class. Longitudinal studies on cooking classes proved those attending cooking classes developed healthier food choices and that these healthier food choices were continued throughout their lives.^{11,12} Culinary training may be the solution for patients attempting to adhere to healthier eating habits because it intersects all the important factors in changing a poor habit: knowledge, attitude, and behavior. Cooking classes that increase culinary skills may ease adherence to MD and develop lifelong healthy eating

patterns. Thus, an increase in MD-based cooking skills may directly correlate to a decrease in the risk of chronic disease and improve a patient's quality of life.

METHODS

An exhaustive online search of medical literature was performed using MEDLINE-Ovid, Web of Science, CINAHL, and Google Scholar databases. The keywords used during this search were: Mediterranean diet, cooking skills, and diet adherence. Inclusion criteria included studies on the Mediterranean diet, measuring of diet adherence as an outcome and/or observed variable, and articles published in the English language. Applicable articles were assessed for quality using the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE).¹³

RESULTS

An initial search of MEDLINE-Ovid using the aforementioned keywords revealed 38 articles. Only one article¹⁴ met eligibility criteria. A search of Web of Science with the keywords revealed only one article¹⁵, and it also met eligibility criteria. A search of CINAHL with the keywords gave zero results. Ten articles were screened on the same keyword search using Google scholar. The single article that met criteria was the same article found previously using Web of Science. In total, two articles were assessed for this systematic review (See Table I).

Monlezun et al

This study¹⁴ was conducted at the Goldring Center for Culinary Medicine (GCCM) at Tulane University School of Medicine. The main purpose of the study was to see if medical school-based cooking and nutrition classes were comparable at controlling the HbA1c in Type II Diabetes (T2D) to the standard registered dietician-led diabetic nutrition course. The study was the first documented randomized control trial (RCT) that consisted of a Mediterranean diet-centered cooking course as the intervention. The GCCM curriculum consisted of six classes over a 1.5-month period, with each class consisting of 30 min of didactic lessons and 90 min of hands on cooking time. Inclusion criteria were

patients diagnosed with T2D. Exclusion criteria were pre-existing enrollment in another study involving diabetic intervention. Twenty-seven patients were randomized into the standard of nutrition education control group (n = 9) and GCCM cooking class group (n = 18). Biometric and psychometric data were collected on all subjects. Psychometric data was collected at baseline and 1.5 months after the last class. This data was measured: dietary habits, attitudes, and nutritional competencies (healthy shopping, meal-preparation, eating). Psychometric data was assessed with a patient reported multi-point Lickert scale survey. Biometric data included: HbA1c, blood pressure, LDL, HDL, HR, BMI, and hypoglycemic agents and insulin. This data is not summarized in this systematic review as data includes surrogate outcomes for improved T2D with a Mediterranean cooking class, but are not measures of diet adherence. Of note, some of these biomarkers did improve in the GCCM cooking class group.¹⁴

Results were analyzed with a confidence interval of 95% and significant p-value of < 0.05. Patients participating in the medical school cooking class had improved psychometric results, yet they were not statistically significant. The two largest differences in psychometric results between the GCCM group and control group were in the percentage of patients who believed they could eat correct portions and in the percentage of patients who used nutrition panels to make food choices. These were both measures of nutritional competency. The GCCM group had an 18% increase in patients who believed they could eat correct portions and the control had an 11% decrease (p = 0.260). The GCCM group had a 34% increase in patients who used nutrition panels to make food choices, while control had 0% increase (p = 0.242). Patients reported an almost similar increase in eating vegetables most nights per week after taking the GCCM cooking course versus control (16% vs. 23%, p = 0.632). The study concluded that there were non-significant healthy eating competency improvements for the cooking class versus control groups.¹⁴

This study had some limitations as noted by the authors. Most notably, this was a small single-site pilot study. There was also a much lower number of subjects in the control compared to GCCM

group due to more control subjects not completing their exposure. This may have been due to recruiter bias, such that patients had more interest in the cooking class and were less likely to drop out.¹⁴

da Rocha Leal et al

This was an observational study¹⁵ to evaluate if an association existed between children's cooking skills and their adherence to a MD. Adolescents in 7th to 9th grade attending a public school in Northern Portugal participated in the study. Out of 533 eligible students, 390 were included in the study (73.2% response rate). The other students were absent or failed to complete a consent form. First, the adolescents were asked to fill out two questionnaires assessing their cooking habits and skills. The first questionnaire included the following questions: "do you know how to cook?", "do you like to cook?", "would you like to cook more often", and "would you like to learn to cook better?" Answers were given on a scale from 0 ("no") to 5 ("very much"). The second questionnaire asked about confidence cooking certain foods and how often they cooked these same foods. The list of foods included cakes, eggs, mousses, rice, potatoes, meat, pasta, soup, fish, and vegetables. In both questionnaires, "cooking" was defined as preparing food from raw ingredients. Next adherence to MD was evaluated with the KIDMED index.¹⁶ The index score indicated poor, medium, or good adherence. All data was collected anonymously.¹⁵

Similar to the previous study, results were analyzed with a confidence interval of 95% and significant p-value of < 0.05. Adolescents reported the lowest frequency and confidence when cooking soup, fish, or vegetables. More specifically, 49% had never cooked soup, 51% had never cooked fish, and 57% had never cooked vegetables. These are all staple food groups in the MD. The KIDMED index for MD adherence was poor for 7.2%, average for 50.8%, and good for 42.1%. The correlation between every response on the cooking habits and skills questionnaire and the KIDMED score was statistically significant ($p < 0.001$). In other words, adolescents with a higher KIDMED score knew how to cook

better, cooked more often, enjoyed cooking, would like to cook frequently, and would like to improve their skills. There were no study limitations mentioned by the authors of this article.¹⁵

DISCUSSION

There has been extensive evidence to show that MD can help decrease the risk factors associated with several chronic diseases. The reason behind what prevents patients from adhering to this diet has not been evaluated well. While the success of current nutritional patient education is controversial,^{17,18} there has been an apparent increase in awareness to what healthy eating entails. Society is becoming more health-aware, yet the number of diseases associated with poor diet continues. Nutrition education alone can increase adherence to the Mediterranean diet independent of socioeconomic status or education level.¹⁹ Even if a clinician were to educate a patient well on the MD, it appears this would not be sufficient for most patients to adhere to the diet. Cooking classes may be a key educational piece that is missing.

In the two reviewed original studies, results showed an increase in culinary skills were associated with improved adherence to the MD.^{14,15} The GCCM study¹⁴ was the first to evaluate the effectiveness of a medical school-based teaching kitchen. The results suggested that participation in a cooking class increased the likelihood that the patient would use a nutrition panel to make food choices more so than with participation in a standard nutrition course without hands on cooking. The Portuguese study¹⁵ highlighted that fish and vegetables are the foods that are most difficult to cook and that are cooked with the least frequency. It also showed that cooking confidence and competency is directly associated with MD adherence. Both studies focused on small populations (diabetics and Portuguese adolescents), so uncertainty exists as to whether these results are relevant to the general population. In regards to the GCCM study,¹⁴ the prognostic homogeneity of the groups was not assessed, so it is unclear if the groups were at a similar level of diabetic control. As for the Portuguese study,¹⁵ while the outcomes of the Lickert scale could be measured without significant judgment, the

fact that the surveys are patient-reported causes subjectivity. Moreover, it was difficult to assess whether or not the children understood what they were being asked on the questionnaires, even though the study mentioned that questionnaires were pretested with volunteer adolescents from another school. It was also unclear if the adolescent subjects had similar home lives, which may be a confounding variable on the outcome of MD adherence. Finally, while the Portuguese study showed a connection between cooking skills and MD adherence, it did not involve a cooking class as an intervention.

Although the overall quality of the reviewed studies^{14,15} was low, there is no reason clinicians should not consider referring patients for cooking classes if they are failing to adhere to the MD. Increasing culinary skills can have a huge impact on patient's quality of life at a very low risk and cost. Cooking classes would be a simple option to increase culinary skills and encourage patients to better MD adherence. Unlike many other medical interventions, patient education programs have no concerning side effects or health risks to consider. As with any recommendation, patients must follow through and make time in their schedule to attend classes; however, classes that are free or low cost and that are made into a fun activity can be very enjoyable for the patient. Learning to cook has social and economic advantages as well. Home-cooked meals promote spending time with family and can even become a hobby. Economically, cooking is a much cheaper alternative for dieting when compared to pre-made meals of expensive diet programs. Additionally, most high-profit diet programs are based more on restricting calories than on an MD, which make them more difficult to adhere to for more than a short period. With all the health benefits of MD and cooking classes, clinicians have no reason not to promote MD-based cooking courses for their patients.

This current collective evidence is not strong enough to prove statistical significance of cooking classes on long-term Mediterranean diet adherence; however, these studies do create ideas for future research. Future studies should include more long-term observation to see how adherence may

continue for a more extended time period after culinary training. How strong is the adherence to MD post improvement of culinary skills? Are more hours of hands on cooking classes associated with longer adherence (dose-response gradient)? In addition, more RCT studies should be done in medical school based teaching kitchens to see if similar results are found in repeat studies. The repeat studies should include populations that include more than diabetics. The Portuguese study questionnaires may also be repeated to see if results are reproducible for American adults. On the economic side, it would be interesting to know how much cooking classes cost to run and if it is feasible for the typical patient. An additional cost consideration for the patient and medical community would be whether or not this would be covered under insurance or if participation in cooking courses could decrease insurance premiums? These two studies are a definite stepping-stone for further research in this area of patient nutrition education.

CONCLUSION

There is evidence presented in the observational study of adolescents and the RCT of diabetic patients that an increase in culinary skills correlates with Mediterranean diet adherence. Cooking classes may also be more beneficial to adherence and other health measures when compared to typical nutrition education courses. Despite the scarcity of research on this topic, the beginning research on MD-based cooking classes is positive enough for medical providers to at least suggest participation to patients. Furthermore, there are no contraindications for this recommendation. Community health programs should begin setting up cooking courses, as it may increase adherence to the Mediterranean diet, as well as the additional benefits of providing a healthy hobby, more possible family time, and better awareness to what is being consumed. Overall, a greater adherence to the MD via a cooking class may be able to significantly improve people's health and quality of life.

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TABLES

Table I. GRADE Quality of Assessment: Characteristic of Reviewed Studies

Study	Design	Downgrade Criteria					Upgrade Criteria	Quality
		Limitations	Indirectness	Inconsistency	Imprecision	Publication bias		
Monlezun et al ¹⁴	RCT	Serious ^a	Not Serious	Not Serious	Not Serious	Likely ^b	None	Low
da Rocha Leal et al ¹⁵	Observation	Serious ^c	Not Serious	Not Serious	Not Serious	Unlikely	None	Very Low
^a Some outcomes patient-reported, smaller single-site pilot study, recruiter bias of patients wanting to attend cooking class, lack of reporting of prognostic factors ^b Small study done by university; first known RCT with novel MD cooking curriculum ^c High risk of reporting bias due to strong reliance on questionnaire responses								